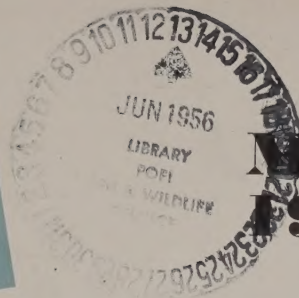


COAST GUARD VESSEL
COMMERCIAL FISHING VESSEL
COMMERCIAL FISHING VESSEL

PAN AMERICAN fisherman

ESTABLISHED 1947



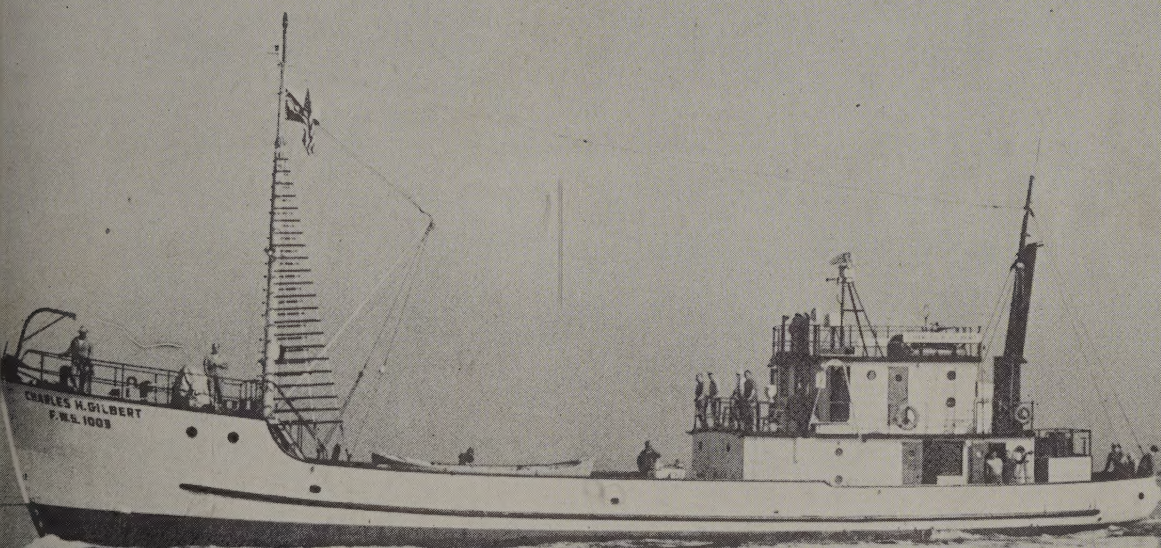
**MAY
1956**

★

50c A COPY

\$3 A YEAR

P. 10
16



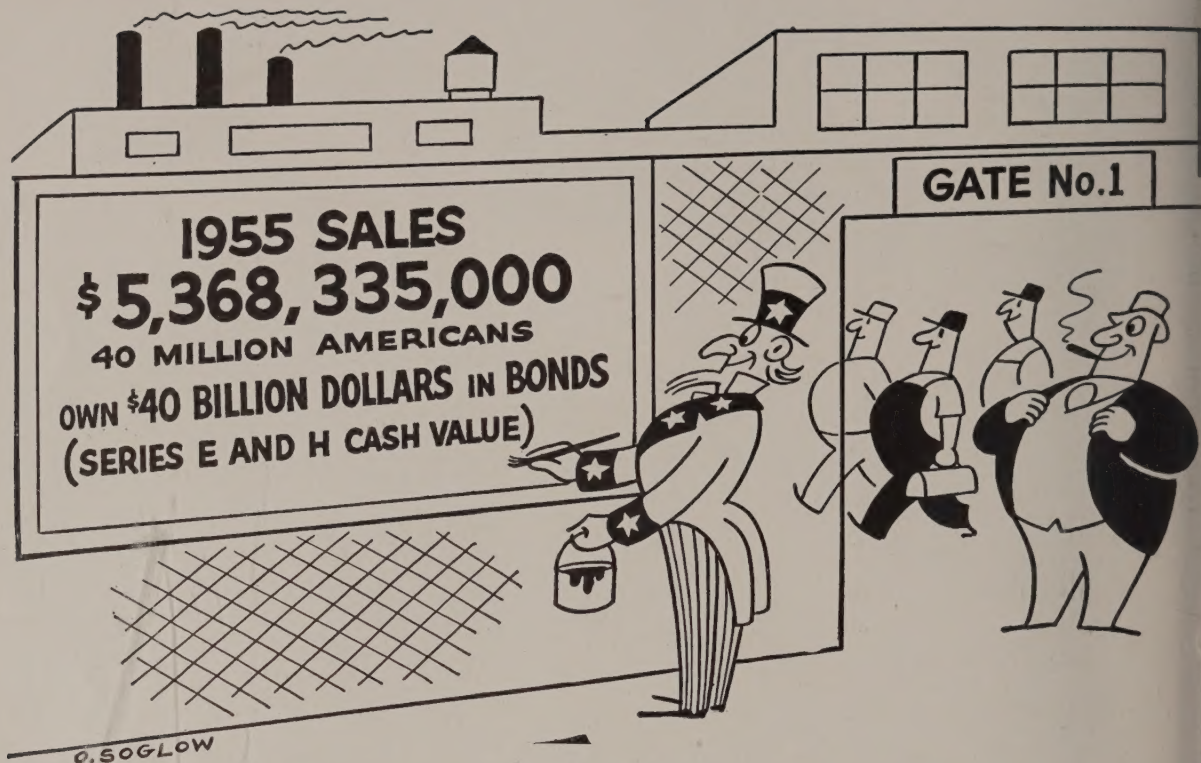
IN THIS ISSUE...

REVISED FISHERIES BILL PROPOSED

★

TUNA AND TUNA-BAIT RESOURCES

COMMERCIAL FISHERIES ARE BIG BUSINESS



SAVINGS BOND BUSINESS IS GOOD— and Good for Business

1955 was a tremendous year for Savings Bonds.

Cash sales of Series E and Series H Bonds hit a ten year peak: \$5,368,335,000; an increase of 10% over 1954 and 23% higher than 1953.

Sales of E and H Bonds exceeded total redemptions of both series (maturities and cashings) by \$716,834,000; up 61% over 1954.

Sales of Series H Bonds—the current income bond sold only to individuals—exceeded \$1 billion for the first time in any year since their introduction in mid-1952.

As of December 31, 1955, the cash value of E and H Bonds held by 40,000,000 individuals totaled more than \$40 billion—the highest amount on record.

Between May, 1951, and December, 1955, Series E Bonds with a face value of \$19.9 billion, had reached maturity. Of these, bondholders still held approximately 70%—\$13.9 billion—under the optional automatic extension terms. The additional interest earned in their extended life increased the cash value of *matured* E Bonds

outstanding December 31st to \$14.6 billion.

During 1955, 8,000,000 employees (of 40,000 companies) invested \$160,000,000 per month in U. S. Savings Bonds through the Payroll Savings Plan.

How many employees were added to *your* Payroll Savings Plan last year? What is the percentage of employee participation today? The average investment in Bonds per month per employee? If you don't know the answers to these questions, why not pick up the phone and get the figures?

If you find that less than 50% of your employees are enrolled in the plan . . . or if you do not have the Plan . . . phone, wire or write to Savings Bond Division, U. S. Treasury Department, Washington, 25. You'll be surprised to learn how easily you can install a Payroll Savings Plan or increase participation in an existing plan to 60%, 70% or higher.

Savings Bond Business is good—and good for business. Act today.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

PAN AMERICAN FISHERMAN



Insuring the Present ... and the Future



As in the Past . . . So in the Future

All Activities of the American Tunaboat Association

Are Directed to the Improvement and Prosperity

of the Tuna Industry

Joseph E. Penacho
President

Harold F. Cary
General Manager

AMERICAN TUNABOAT ASSOCIATION

No. 1 TUNA LANE

•

SAN DIEGO, CALIFORNIA

LETTERS TO THE EDITOR

Dear Editor:

As stated in your last issue, President Eisenhower has proclaimed a conditional increase on foreign imports of tuna canned in brine.

Perhaps your readers will also be interested in knowing that I appealed to the Secretary of State last August to "lift the dead hand" of an agreement made with the Republic of Iceland in 1943. This permitted Iceland to send tuna to the United States at a maximum duty of 12½%. Actually, Iceland does not produce tuna, but the effect of the agreement was to prohibit a duty higher than 12½% being imposed on tuna shipments from other nations.

Following World War II, Japan started glutting the United States market with tuna, including tuna in brine. One of the steps promptly taken when the California tuna industry, including fishermen and cannerymen, appealed to me for relief, was to ask to have the Iceland agreement "renegotiated."

The President's proclamation authorizes raising the import duty on tuna in brine from 12½% to 25% when foreign imports of this type exceed 20% of American production of all tuna. In the remainder of 1956, the increase will be permitted if imports go above 15%.

Meantime, bills designed to establish a national policy for American fisheries and to extend various forms of assistance to the industry have been introduced in the Senate by Senator Magnuson (of Washington) and myself.

The American tuna industry—fishermen, boat-owners, indeed all who labor in it, and their families—should be heartened by present indications that at last their difficulties are being recognized and action is being taken to remedy injustices done to an important segment of our California economy.

Our Federal Government in 1943 could not anticipate the far-reaching effects the Icelandic trade agreement

would have on American enterprise. Our government today is to be commended for its steps to rectify an unfortunate feature of that agreement. I intend to continue urging further legislative and administrative action to assure fair treatment to our own citizens whose livelihood is dependent upon the success of this great industry.

THOMAS H. KUCHEL
U.S. Senator from Calif.
Washington 25, D. C.

Dear Editor:

I was quite interested in the article by Dr. Francis Minot in a recent issue of Pan American Fisherman Magazine, and eager to know more about the work at Ocean Resources Institute. Those of us who work in our fisheries recognize how little we know about marine life, and yet share your belief that the seas contain an inexhaustible reservoir of food and raw materials.

Sometime I hope we can discuss this at greater length. Or if you have any other matter you can send me, I would be appreciated.

J. S. DE SILVA, President
South Coast Fisheries, Inc.
Terminal Island, Calif.

Subscribe Here . . .



12 ISSUES \$3
TWO YEARS FOR \$5

MAIL THIS NOW . . .

PAN AMERICAN FISHERMAN
Orange, California

Please start my subscription with the next issue

_____ 1 year \$3

_____ 2 years \$5

(Canada \$4 per year)

(Foreign \$5 per year)

Name _____

Firm _____

Street _____

City _____ Zone _____

State _____

FOR PROMPT ATTENTION SALES · PARTS REPAIRS · SERVICE

CATERPILLAR
MARINE DIESEL ENGINES

WOOD FREEMAN
**METAL
MARINE
PILOT**



BENDIN
depth
RECORDER

FEDERAL
PROPELLERS

Universal
100% MARINE
MOTORS

RCA
RADIOMARINE
Radiotelephone
AND
Radio Direction Finder

SHEPHERD

MARINE
2031 BELT STREET - SAN DIEGO
Phone Belmont 99471

PAN AMERICAN Fisherman

Published Monthly

Established 1947

KELlogg 8-5441
Orange Savings Bldg.
ORANGE, CALIFORNIA

"BUSINESS MAGAZINE OF THE WEST COAST FISHERIES"

BRIANT SANDO—Editor and Publisher

ROBERT K. LAWSON
Associate Editor

STAFF PHOTOGRAPHERS
Busco-Nestor Studios

ADVERTISING REPRESENTATIVES

Richard S. Meyer
3137 Kelfton Ave.
LOS ANGELES 34, CALIF.
Telephone Bradshaw 2-1456

A. S. Babcock Co.
605 Market St.
SAN FRANCISCO 5, CALIF.
Telephone Yukon 2-3954

Howard F. McClenahan
402 - 1010 Euclid Bldg.
CLEVELAND 15, OHIO
Telephone Prospect 1-6100

Frederick S. Meyer
168 N. Michigan Ave.
CHICAGO 1, ILL.
Telephone Financial 6-0993

W. R. Ewald
P.O. Box 228
FRANKLIN, MICH.
Telephone Mayfair 6-1138

C. A. Larson & Associates
254 West 31st St.
NEW YORK 1, N. Y.
Telephone Longacre 4-4285

VOL. 10 - No. 10

MAY

1956

TABLE OF CONTENTS

	PAGE
Letters to the Editor.....	4
Sound Fisheries Program.....	6
Report from Washington, D. C....	7
Commercial Fishing Is Big Business	9
Tuna and Tuna-Bait Resources In the Pacific Ocean.....	10
Revised Fisheries Bill Proposed in Senate.....	12
United Report of the N. B. Scofield.....	16

About This Issue . . .

MOST industry leaders these days are keeping one eye on the doings in Washington, D. C. The struggles in Congress to work out a fisheries bill that will please all the various interests . . . the activities of the Senators and Representatives from our Western States . . . and the work and recommendations of the American Fisheries Advisory Committee . . . see "Report from Washington" on page 7.

Then for a first-hand view of what our legislators are doing and thinking in connection with this industry, there's word from Senator Kuchel in "Letters to the Editor" on page 4; "A Sound Fisheries Program" by Senator Saltonstall on page 6;

and a plan to completely revamp the fisheries department of our government and help it to occupy a more important place, "Revised Fisheries Bill Proposed," by Senator Warren Magnuson on page 12.

Where are the elusive tuna on many of our fishing trips? What are we going to do about tuna-bait? These are the questions often asked by puzzled fishermen and boat owners. The subject is of such great importance that we have devoted more than the usual space to a lengthy essay by Dr. Milner R. Schæfer of Scripps Institution of Oceanography . . . "Tuna and Tuna-Bait Resources" on page 10.

Publications: PAN AMERICAN FISHERMAN • FRUIT & VEGETABLE REVIEW • MOTOR WEST

PAN AMERICAN Fisherman is published monthly • Business and executive offices—Orange Savings Building, Orange, California, telephone KELlogg 8-5441. Master: Form 3579 requested. Subscription rates in the United States and possessions, one year \$3.00; two years \$5.00; five years \$10.00. Canada \$4.00 per year; all other countries \$5.00 per year. Current copies 50c each; back numbers \$1.00 each when available. In case of change of address, subscribers are requested to notify both the Post Office and us, and allow one month for change to take effect. Entered as second class matter March 12, 1953, at the Post Office at Orange, California, under the Act of March 3, 1879. Printed in U.S.A.

A Sound Fisheries Program

"Freedom of the seas" is one thing; "sovereignty over the seas by adjacent countries" is a different and incompatible doctrine, Senator Leverett Saltonstall (R-Mass.) told members of the National Fisheries Institute at their 11th Annual Convention, Hotel Seville, Miami Beach.

Sen. Saltonstall was speaking of the failure of the Inter-American Council of Jurists at their recent Mexico City meeting to study and discuss adequately conservation problems. "Responsible officials of our government," he said, "are most disturbed about the actions taken, with no study and little discussion."

"The United States," he said, "second to Japan, is the largest fishing country of the world. We harvest close to five billion pounds of food from the sea each year. While most of this comes from off our own shores, our fishermen fish in the high seas off the coasts of many other countries, and the fishermen of a good many other countries fish in the high seas off our coasts, too."

Since we are a leader in conserving natural resources, the Senator went on to say, we have found peaceful means of protecting the harvest of the seas without detriment to the "freedom of the seas" doctrine, and we cannot afford to injure that doctrine.

Treaties are now in effect with other nations on the seal, halibut and salmon fisheries of the North Pacific; Great Lakes fisheries; South-east Pacific tuna fisheries; North-west Atlantic fisheries; and world whale fisheries.

"Friendship with our good neighbors to the south has long been a keystone in our foreign policy," he reminded his audience. "International cooperation, mutual study of mutual problems, calm discussion and debate of ideas, and multilateral approach to the solution of political, economic, judicial, security, social and defense questions has made the relations between the nations of the Americas a model for the rest of the world."

Sen. Saltonstall also reported on the money spent under the Saltonstall-Kennedy Act, which provides the Fish and Wildlife Service \$3,000,000 a year for three years.

Nearly half of the last year's allotment was used for biological research on fish and fisheries. Almost the same amount was spent for research in the exploration, development and utilization of our fishery resources. In carrying out this policy, the Department of the Interior has let about 60 contracts for research work in every section of the country. Fish technological studies, market development and fishery education have had their share of the funds. "We must broaden our markets," he said. "We must educate younger people to develop improved methods of fishing."

He spoke of "one of the most astounding developments in fish processing and marketing"—the development and highly successful promotion of fish sticks.

"What is required," he concluded, "are not resolutions but resolution, the determination to exercise that imagination and initiative which have for many generations characterized this nation, and which can, if exercised to their full extent, bring a new era of progress and profit to the fishing industry."

"With new processing methods, attractive and dramatic packaging techniques, and the impetus of an imaginative promotional campaign, the American fishing industry can, I am confident, regain the dominant position it once enjoyed and serve both its own purposes and those of the nation in a constantly growing and in a very satisfactory and substantial way. *

N.F.I. Officers

The National Fisheries Institute, at its 11th annual convention in Miami Beach last month, elected the following officers:

President—Frank W. Wilkisson of New York City; Secretary—Aldo Casaretto of Los Angeles; Treasurer—Ralph E. Carr of Kansas City, Missouri. The following Vice Presidents were elected: Region I—Sidney H. Cohen of Boston; Region II—H. R. Humphreys, Jr., of White Stone, Virginia; Region III—J. Roy Dugan of St. Simons Island, Georgia; Region IV—Elmo C. Jack of Los Angeles; Region V—Norman Weitkamp of Seattle; and Region VI—L. R. Besore of Chicago.

Cruise Report on Pink Shrimp

Good catches of "cocktail-size" pink shrimp were made off the coast of Washington by the Fish and Wildlife Service's exploratory fishing vessel *John N. Cobb* during a four-week cruise which ended on April 20. Best fishing areas yielded shrimp at the rate of 2,000 pounds per hour off Grays Harbor, and fairly consistent catches of 500 pounds or more per hour were made in several areas with a Gulf of Mexico shrimp trawl.

This was the second shrimp exploration off the Washington coast conducted in cooperation with the State of Washington Department of Fisheries. The first trip in the fall of 1955 revealed that the shrimp beds extended over a wide area from off Willapa Bay to off Cape Johnson principally at depths between 50 and 100 fathoms.

Excellent Prospects

The second trip showed excellent prospects for development of a commercial shrimp fishery off the Gray Harbor area. Most productive depths were from 65 to 85 fathoms both north and south of the entrance to Grays Harbor on green mud bottom. In order to test commercial possibilities in one of the better areas, the *John N. Cobb* made a series of "production" drags over a 6-hour period approximately 26 miles true west of Copalis Head on April 18. From a.m. to noon, seven 30-minute drags at 74 to 79 fathoms produced a total of 5,210 pounds of shrimp. Random samples from these catches ranged from 110 to 122 whole shrimp per pound.

Ninety-four drags, mostly of one hour duration, were completed during the trip at depths of 48 to 111 fathoms from off Long Beach to Destruction Island. Fifty-one drags were made with a 40-foot Gulf of Mexico shrimp trawl having a 1½-inch mesh cod end, 39 with a 20-foot beam trawl and four with a small-mesh Western otter trawl.

The Gulf shrimp trawl, used for the first time in this region as far as is known, proved to be from two to three times as efficient as the beam trawl. The gear caught only small amounts of fish, mostly species not considered as food fish such as skat, ratfish, turbot, etc. The Gulf trawl was fished from one trawling vessel on a 25-fathom bridle, a method easily adaptable to small commercial vessels in the 50-60 foot class.

Report from *Washington*

Items Gleaned from the Nation's Capital

ADVISORY COMMITTEE MEETS.--Some of the top fisheries men from all over the country attended an important three-day meeting of the American Fisheries Advisory Committee in Long Beach, California, the first week in May. The delegation from Washington included the Assistant Secretary of the Interior and John L. Farley, Director of the Fish and Wildlife Service.

Others in attendance from FWS were A. W. Anderson, Chief, and J. T. Whiteleather, Assistant Chief, Branch of Commercial Fisheries; Paul J. Thompson, Assistant Chief, Branch of Fishery Biology; and Norman B. Sigutoff, executive secretary to the Committee.

While most of the sessions were "closed" and no news given out for publication, it is understood the main discussions covered the fisheries legislation now pending in the Congress (see pages 6 and 12 in this issue) and the proper apportionment of funds for the coming year under the Salmon-Peters-Kennedy Act.

One of the concluding features was a banquet staged by the California Fish Cannery Association, headed by executive manager Chas. R. Barry and President William Moorhead. Donald P. Loker of Star-Kist was master of ceremonies for the gathering of about 75 delegates and guests, including representatives of all segments of the industry--fishermen, boat owners, cannerymen, unions, and the press.

--o--

THE 84TH CONGRESS.--There is some talk around the Capital that this session will go down in the records as "another do-nothing one." While hundreds of bills have been introduced and considered, there is more time devoted to arguments than to actions.

Of course this go-slow attitude is because the legislators have one eye on the elections coming up this fall; they don't want to favor anything that might cost them votes "back home." And a great deal of the pending legislation is more or less controversial. Even the various proposals for a fisheries bill are still being modified and changed in certain sections in order to satisfy as many people as possible.

It begins to seem pretty certain that out of all of the above, a reasonably good fisheries bill finally will emerge and be passed before the Congress convenes. But this is going to take some more time and some more re-writing, according to those on the inside here, although 28 Senators have co-sponsored the amended bill S. 3275 of Senator Magnuson of Washington.

In addition to Magnuson who is chairman of the committee on Interstate and Foreign Commerce, Senator Thomas H. Kuchel of California is active on fishery legislation . . . ably assisted in the House by Representatives King and Bob Wilson of California.

THE PRESIDENTIAL RACE.--Many eyes here are being turned toward California as the State primary election draws near. Both Stevenson and Kefauver need to make a good showing in California in order to go far when the Democratic national convention gets down to business.

There is a pretty strong feeling here that both of these men are just killing off one another . . . that the final choice will simmer down to Harriman of New York, Symington of Missouri, Lausche of Ohio, or Lyndon Johnson of Texas.

The latter, since his defeat of Gov. Shivers in the Texas primaries, has taken on new political stature; but his heart attack a year ago was even more serious than Ike's, and may relegate him to the vice presidency nomination. Kefauver also is a possibility for vice president, but Adlai is shooting for the top spot or nothing.

On the Republican side there is no longer any argument or any room for doubt: the ticket will be Eisenhower and Nixon, unless something utterly unexpected turns up.

--O--

TRAINING OF FISHERIES PERSONNEL.--Rep. McCormack introduced into the House a bill (H.R. 10433) to promote the fishing industry in the United States and its territories by providing for the training of needed personnel for this industry.

Other leading countries have adopted similar programs. This proposed bill has been referred to the Committee on Merchant Marine and Fisheries.

--O--

CURRENT FISHERY PUBLICATIONS.--How to get information about commercial fisheries is told in a leaflet just released by the Fish and Wildlife Service. More new data of value to the fishing industry is being produced by research projects and services now made possible with Saltonstall-Kennedy Act funds and issuance of this information is being expedited.

The new leaflet not only names and briefly describes current literature but also lists reports available through the Marketing Service of the Department of Agriculture, the Bureau of Census, the Bureau of Foreign Commerce, the Bureau of Labor Statistics, the Archives, Tariff Commission, and the Bureau of Customs.

Copies of Fishery Leaflet No. 432, "Fishery Statistical Publications of the Fish and Wildlife Service," are available without charge through the Division of Information, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

--O--

ALASKA RESEARCH PROJECTS.--The effect which Alaska's new industry, logging for pulp production, will have upon its old industry, salmon fishing, will be the object of a special study to be made by the Fisheries Research Institute of the University of Washington under a contract signed by John L. Farley, Director of the Fish and Wildlife Service. The contract provides for an expenditure of \$35,000 and is for one year's duration.

(Continued on page)

Commercial Fishing Is Big Business

It would take a capital outlay of \$10½ billion at 4% annual interest to maintain earnings equivalent to those obtained in the American commercial fisheries during 1955, reports Secretary of the Interior Douglas McKay. He based his statement on an analysis of the 1955 fisheries made by the Fish and Wildlife Service and released recently in Fishery Leaflet 393.

Earnings, which in this instance include profit on the investment and wages or commissions paid those who handle the fish in the various states, are estimated statistically as follows: At the boat side, 75% of the value of the catch at that point; processor level, 10% of the value at that stage; wholesale, 5½%; retail, 8%.

The catch for 1955 was 4.6 billion pounds and the value to the fishermen was \$325,000,000. At the processor level the 1955 catch was worth \$48,000,000; at the wholesale level, \$75,000,000, and at the retail level, \$10,000,000. In all instances these are slightly below the 1954 figures; the value to the fishermen in that year was \$360,000,000.

There were 555,000 workers employed as the result of the activities in the fishing industry. Of these 153,000 were fishermen, 4,000 transporters and 98,000 shore workers which include those engaged in canning and other processing. There were 300,000 employed indirectly in such industries as gear manufacture, boat building and manufacturing processing equipment. This is slightly less than the 568,394 employed in 1950 but considerably higher than the 428,965 work in 1945.

American fishermen and businessmen had an investment with a replacement value of \$958,000,000 in the commercial fish business in 1955. The \$958,000,000 figure is an estimated replacement value based upon 1955 data which shows that boats and gear in the commercial fisheries represented an original investment of \$128,204,000, freezing and processing plants, \$215,649,000; wholesale facilities, \$193,475,000 and fish units in retail establishments, \$92,257,000.

There were 87,000 craft of all

types engaged in the year's fishing. These included 11,000 vessels of five tons net and over; 48,000 motor boats and 26,000 other boats, all engaged in fishing. In addition there were 2,000 boats used for transportation of fish and shellfish between the fishing grounds and the docks.

Pacific Coast Rates No. 1

The Pacific Coast States had the highest number of processing plants, 148. Of these Washington led with 76, California second with 52 and Oregon next with 20. The South Atlantic and Gulf States were next with 131 plants, Louisiana having 63 and Mississippi 23. The New England States had 84, of which 63 were in Maine; the Middle Atlantic States had 46 with 20 in New Jersey and 16 in New York. There were 20 processing plants in the Mississippi Valley and Great Lakes regions, of which 11 were in Iowa. Alaska was far in front among areas outside the continental United States with 109; Puerto Rico and American Samoa had one each and Hawaii 2. There were 400 plants in which fish were canned and 227 in which byproducts were processed. The total number of plants, with duplications excluded, was 579.

The monthly catch in 1955 hit its peak in July when 387,800,000 pounds of fish were taken. The April catch was 170,200,000 pounds and the December catch 271,400,000 pounds.

In value at the boat the shrimp industry was at the top, a position it has held for several years. The 1955 value of shrimp was \$70,000,000. Tuna and salmon follow in that order.

The 1955 supply of canned sardines was considerably below that of 1954. Heavy reductions in the supply of canned salmon and more moderate reductions in canned tuna stocks are noted. There was a decrease also in the supply of ground fish fillets, including ocean perch. Slight increases are noted in the supplies of shrimp, canned crab meat and northern lobsters.

The menhaden catch accounted for nearly 40% of the total production.

Both salmon and tuna catches were down sharply in 1955.

San Pedro Leads Ports

San Pedro, California, retained its leadership of individual ports in pounds of fish landed, 365,000,000; followed by Reedville, Virginia, with 305,000,000; Lewes, Delaware, with 274,00,000; and Gloucester, Massachusetts, with 265,607,000 pounds.

The breakdown of manufactured products for 1955 was not available at the time of the analysis but the 1953 figures show that \$585,995,000 value at the processor level was divided as follows: Canned products \$306,874,000; packaged shellfish, \$115,994,000; byproducts, \$74,372,000; packaged fish, \$52,163,000; cured fish \$36,592,000. Since the estimated value of the 1955 catch at the processor level is \$548,000,000 the value of the various categories will probably be correspondingly less.

Fresh-water fishing in 1953 employed the most number of fishermen, 24,000; salmon was next with 21,000, then clamming with about 16,000 and shrimping fourth with 15,000. There were 14,000 engaged in taking oysters; other fisheries employed less than 9,000 each with the Maine herring fishery fifteenth on the list with only 1,050 workers.

Latest data on an area basis is for 1954 when the total American catch was 4,645,000,000 pounds, 45,000,000 pounds higher than the estimated catch for 1955. The data show the Atlantic and Gulf area most productive with 3,301,405,000 pounds, followed by the Pacific Coast States with 825,966,000, Alaska with 337,629,000 pounds and the Great Lakes and Mississippi River fisheries with 180,000,000 pounds.

Imports of edible fishery products for 1954 totaled 803,369,000 pounds compared with 725,195,000 in 1953 and 404,768,000 in 1945.

World data for 1953 included in the report show a catch of 60,000,000,000 pounds of fish. Japan led all nations with nearly 17% of the catch. Mainland China and Russia followed in order and the United States was fourth with 8% of the world catch. *

The Inter-American Tropical Tuna Commission and conservation of the

TUNA & TUNA-BAIT RESOURCES

In the Eastern Tropical Pacific Ocean

THE fishery for tropical tunas, supported by the yellowfin tuna (*Neothunnus macropterus*) and the skipjack, or "barrilete" (*Katsuwonus pelamis*) is the most valuable fishery in the Eastern Pacific Ocean. In 1954 it produced 139 million pounds of yellowfin and 174 million pounds of skipjack.

Most of the catch is taken by modern long-range fishing vessels based on the West Coast of the United States. A small but significant quantity is also taken by vessels based in Peru, while smaller quantities are landed in Costa Rica, Ecuador, Chile, Panama and Mexico. The landings in these countries are mostly transhipped frozen to the United States for canning, although small amounts are canned or otherwise used locally.

Over 80% of the catch of tunas is made by pole and line, live bait-fish being used to attract the tuna to the vessel and to induce them to bite. The remainder of the catch is made by purse-seine. Whereas most of the tuna are captured on the high seas, the various fishes used for tuna bait are mostly taken close inshore.

The growth of the fishery is illustrated in Figure 1, showing the landings of tunas, by species, from 1918 through 1954. In the beginning, fishing was conducted in waters not far from the canneries in Southern California. With the development of longer range vessels, and equipment for refrigerating the catch, the fishery expanded rapidly southward, reaching the equator by 1931. Subsequently, the fishery has expanded further southward, along the Peruvian and Chilean coasts, to about the southern limit of distribution of these species.

Dr. Schaefer is Director of Investigations, Inter-American Tropical Tuna Commission, with offices at the Scripps Institution of Oceanography, La Jolla, California; and this article was prepared for a Conference in Ciudad Trujillo on the "Conservation of Natural Resources: the Continental Shelf and Marine Waters" under the sponsorship of the Organization of American States.

By MILNER B. SCHAEFER

As may be seen from Figure 1, the growth of the fishery was interrupted during World War II, when many vessels were taken into Naval Service. With the end of the war, the catch rapidly recovered and increased to well above the prewar level. Since 1950, the total catch has fluctuated about 300 million pounds per year.

The Inter-American Tuna Commission

The very rapid post-war growth of the fishery gave rise to considerable concern as to the effects of fishing on the tuna resources and on the bait resources. Only very fragmentary scientific information was available respecting either the tunas or the important bait species, and no one had any information on the effects of the growing fishery on the fish stocks.

In order to make possible the gathering of scientific information respecting the tropical tunas, and the bait-fishes, there was signed in 1949 and ratified in 1950 a Convention between Costa Rica and the United States establishing an Inter-American Tropical Tuna Commission. The purpose of the Commission is to gather and interpret factual information to facilitate maintaining, at a level which will permit maximum sustainable harvests, the populations of tuna and bait-fishes.

The Commission is authorized and directed by the Convention to undertake various kinds of scientific investigations for this purpose, and, on the basis of these investigations, to make recommendations for joint action to the member governments.

The Convention provides that any other nations having an interest in this fishery may adhere by simple exchange of correspondence with existing members. Panama joined the Commission in the fall of 1953.

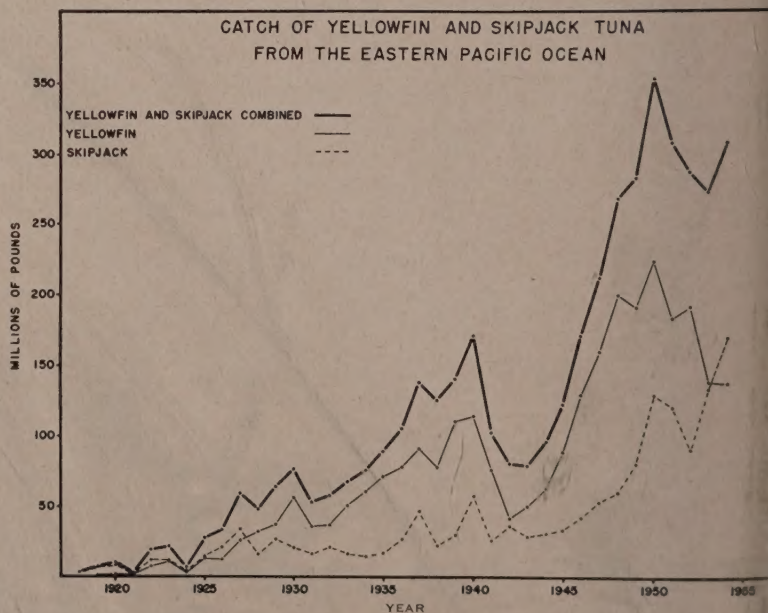


FIGURE 1.—Total landings, by species, of yellowfin and skipjack tunas from the Eastern Pacific 1918-1954.

The Commission commenced its research in 1951 with a small scientific staff, which has since been increased by additional personnel. After five years of investigations, a great deal of progress has been made on gathering the basic scientific knowledge required for the conservation of the resources. Although much remains to be learned we have now sufficient knowledge to assess the general status of the fishery, and, through continuing observations, will be able to detect any overfishing. Studies of the life history, biology, ecology, behavior, and population dynamics of the species with which we are concerned are being vigorously pursued, in order to provide a sound basis for conservation action at such time as action is warranted.

The staff of the Tuna Commission has been particularly fortunate in having the opportunity to commence its research at a stage of development of the fishery prior to serious overfishing. Very often, scientific research is not commenced on a fishery resource until an economic crisis is brought on by overfishing. In this instance, we have a rather unique opportunity of maintaining the harvest of the fishery and preventing serious overfishing before it occurs.

Research on the Tropical Tunas Geographical Distribution and Population Relationships

Yellowfin and skipjack tunas occur in all the warm oceans of the world. In the Pacific they are distributed in a wide belt along the equator between the isotherms of approximately 20°. Off the shores of the Americas, these species are found in commercial abundance from approximately latitude 32° N. to 20° S., appearing seasonally during the summer months at the extremes of the range, but being present throughout the year in the central portion.

Skipjack, which tolerate somewhat lower temperatures than yellowfin, are found somewhat farther to the north and south than the latter species. The commercial fishery extends latitudinally over the entire range, and offshore from the mainland to a distance of some 300 miles, or farther where there are outlying islands such as the Rivella Gigedo Islands, Galapagos, and Clipperton.

The tunas are not found in equal abundance in all parts of this range, but are concentrated in localities where feeding conditions are most favorable, due to oceanographic factors. In Figure 2 is shown the region of the American fishery, with the



FIGURE 2.—Chart of the Eastern Tropical Pacific showing the region of the tuna fishery with areas of heaviest tuna concentration double cross-hatched.

localities of heaviest concentration shaded in more heavily.

It is of obvious importance to know whether the tunas found in the region of the American fishery are members of populations indigenous to this region, or whether they are members of larger, trans-oceanic populations. This must be known for considering the magnitude of the catch in relation to the sizes of the resources, determining the regions in which research must be conducted, and outlining areas which must be included in any management measures.

From several lines of evidence (morphometric studies, tagging results, and analysis of catch data) it has been concluded tentatively that the yellowfin tuna of the American fishery belong to a population distinct from those farther westward. So far as skipjack tuna are concerned, the factual information is as yet inadequate for drawing conclusions.

It is also of great importance to determine whether *within* the range of the American fishery there exist distinct or semi-distinct populations, which should be considered as independent biological units in conservation management.

The Commission staff is investigating this matter by means of morphometric comparison of series of specimens from different areas, by tracing migrations of tagged tunas, by analysis of size composition of catches, and by other means. Data are not yet sufficient for drawing firm conclusions. Pending solution of this problem, data on catch, fishing effort, and abundance are being collected by the smallest practical geographical subdivisions, so that they may be subsequently recombined according to whatever natural boundaries may exist.

Collection, analysis, and interpretation of catch statistics

The central problem of the Commission is to measure the effect of fishing on the abundance and yield of the tuna resources, and, in particular, to determine whether the current level of fishing effort is above or below that corresponding to maximum sustainable harvest. In order to accomplish this, it is necessary to measure over a considerable series of years the amount of fishing, the abundance of the tunas, and the magnitude of the catch, for each species.

This sort of data is best obtained from detailed records of the fishery. One of the first tasks of the Commission's staff was, therefore, to gather all available historical data of this sort, and to establish a continuing system of collecting such information on a current basis.

It has been possible to compile information respecting total catch of each tuna species since the early years of the fishery from the records of tuna canners and of governmental agencies in the United States and other countries, and we collect them on a continuing, current basis.

The relative abundance of each tuna species is measured by computing the average catch-per-day-of-tuna-fishing from logbooks, kept by masters of fishing vessels, in which are recorded for each day of fishing the locality and amount of catch.

Since 1951, when we commenced our researches, over 80% of all trips made by vessels landing in the United States have been covered by such logbook records. For earlier years, a number of vessel masters had kept logbooks for their own purposes which they kindly made available to us. An adequate sample of landings are covered by such logbook records since 1947, and some logs are available back to 1930.

For the entire series of years 1934-1954 there are available basic data for nearly the whole U.S. fleet to compute the catch-per-day's-absence-from-port. Fortunately, analysis of the logbook data for years 1936-1953 revealed that there is a fairly constant relationship between catch-per-day's-absence and catch-per-day-of-tuna-fishing, so it has been possible to convert these data to nearly years, giving us a comparable series of estimates of abundance, as encountered by the fishermen, of each tuna species over the past 20 years.

(Continued on page 14)

Revised Fisheries Bill Proposed

For a Sound National Policy

ON behalf of myself and Senator Kuchel of California, I have submitted an amendment to our joint bill (S. 3275) to establish a sound and comprehensive national policy with respect to the fisheries; to create and prescribe the functions of the United States Fisheries Commission; to strengthen the fisheries segment of the national economy.

For several years the fisheries of the nation have not prospered. Little attention has been granted to them by the Congress or by the executive branch of our Government. The situation of several of our major fisheries has become particularly critical in the past two or three years. At a time when the general economy of the country has been prospering, our fisheries have been going downhill.

On February 23, I introduced S. 3275, for myself and Senator Kuchel. This bill sought to reverse this downward trend of the fisheries by reorganizing the administration of the fisheries in the Federal Government. The Subcommittee on Fisheries of the Interstate and Foreign Commerce Committee held public hearings on S. 3275 between March 19 and 24, at which representatives of various branches of the fishing and fish-processing industries from every section of the nation were heard, as well as governmental witnesses.

Immediately after the hearings we prepared a substitute bill which incorporated various suggestions and recommendations offered by witnesses testifying at our hearings. This was circulated for comment to every fisheries association, fisheries cooperative, and fisheries union in the country, as well as to upward of 600 individual firms in the industry. Strong letters and wires in support of this substitute measure have been coming in from every segment of the domestic industry in every section of the country. No adverse comment has been received from anyone in the domestic fish producing and processing industries.

Accordingly, we are now introducing this substitute for S. 3275. It provides these things:

First. It enunciates a sound and comprehensive national policy with respect to the fisheries.

Second. It creates a semi-independent United States Fisheries Commission within the Department of the Interior to carry out the policy.

Third. It prescribes the functions of the Commission, which will have all of the fisheries functions now carried out by the United States Fish and Wildlife Service, as well as some others.

Fourth. It defines the status of the Commission within the Department of the Interior, much along the lines of the Maritime Board and the Civil Aviation Board. Essentially, the Commission will be independent of the Secretary of the Interior, with respect to the framing of conservation regulations, investigations, and reports and recommendations based upon those investigations, and it will be guided by the general policies of the Secretary of the Interior in its other functions.

In other words, it would be responsible to the Secretary of the Interior only for its housekeeping.

The Congress has never, so far as I know, enunciated a national policy for the fisheries. The indefinite manner set forth by the Government to regulate this important phase of our national economy has never been set forth as a unified statement. Certainly this is a basic reason for the disturbed economic conditions that affect most of our major domestic fisheries. We hope to remedy that lack by stating a clear and comprehensive national policy for the fisheries in this bill.

Also there has been little or no consistency in the administration of the fisheries by the Government. Every time the administrator of the fishery agency changes, there has been a longer or shorter period of unrest in the fisheries. For this reason we have provided for a bipartisan commission of five men to be appointed by the President with the advice and consent of the Senate. Each of the Commissioners will have

a term of six years and they will be appointed for staggered terms. Thus we hope to provide stabilization of policy and its administration for the fisheries.

In the postwar years the international problems of our major sea fisheries have grown apace. We now have seven international fisheries commissions upon which the Federal fishery agency, by law, has a member. Additionally there are numerous international conferences and negotiations treating with the fisheries whose representation by the Federal fishery agency is necessary. In these meetings and in these international commissions, the American representative often deals with Ministers of Government and nearly always with representatives on the policymaking level in the foreign governments. To meet these foreign representatives on an equal level, and effectively, our representatives require more prestige than they now have. This is one of the reasons why we have provided for five commissioners, directly under the Secretary. On the one hand this will provide enough manpower for these manifold international activities and, on the other, it will provide our representatives with sufficient prestige to meet with the foreign colleagues on a basis of closer equality. Additionally, we have provided for closer liaison between the Commission and the Department of State than exists at present.

The cosponsors of this amendment and I do not expect its passage will solve all of the economic and international problems of our fisheries. We do look upon it, however, as an essential step forward in that direction and as laying a solid foundation for gradually improving the status of the fisheries in the international field, in the Federal Government, and in the economy of the nation. Here is a brief summary of what is sought to be accomplished by the amendment.

Summary

S. 3275, to establish a sound and comprehensive national policy with respect to the fisheries; to create and prescribe the functions of the United States Fisheries Commission.

ates Fisheries Commission; to strengthen the fisheries segment of the national economy; and for other purposes.

The bill, as revised after the hearings, would establish a semi-independent Fisheries Commission under the Secretary of the Interior, appointed by the President by and with the advice and consent of the Senate, to administer and promote domestic fisheries on a national level in the United States and Territories.

The United States Fisheries Commission would be composed of five members, at least three of whom would be required to have practical knowledge of domestic fisheries. Each member would serve for a term of five years, except the ones first appointed who would have staggered terms, and not more than three such members would be from the same political party.

The policy level of Federal fisheries management would thus be raised. The Commission would exercise a degree of independence in formulating conservation regulations to advance the fisheries, and it would have authority to investigate conditions, conduct research programs, to pub-

lish reports, and to make recommendations directly to the Congress, the President, and to the public relating to fisheries.

With a general national program for administering Federal fisheries under a five-man Commission, it will be possible for the first time in our Nation's history to employ practical trained men from the industry to assist in the management of this valuable resource and important segment of the national economy.

It is contemplated that greater security in American international fisheries relations will result from this program, administered by the Commission working in cooperation with the Secretary of State.

Under the Commission authority greater cooperation can be maintained between the Federal and State interests for the advancement and protection of domestic fisheries, and with the agencies established under international treaties and conventions.



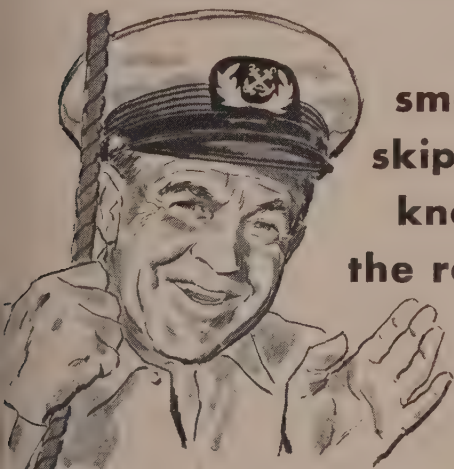
California Leads in Canned Fish Products

California led the Nation in 1955 in the production of canned fish and in the manufacture of fishery byproducts, according to figures released in a report by the U.S. Fish and Wildlife Service. The total value of the commodities was \$147,350,000, nearly 40% of the national total of \$386,000,000.

Alaska was second with canned fish and byproducts valued at \$60,000,000; Washington was third with like commodities valued at \$26,500,000, with Oregon, Maine and Louisiana grouped with outputs approximating \$21,000,000.

Nationwide there were 533 establishments engaged in putting fish in cans and in preparation of byproducts.

The value of the canned commodities was approximately \$303,575,000 and that of the byproducts about \$82,500,000. The value of canned tuna and tuna-like fish was \$125,000,000; salmon \$81,000,000; Pacific sardine \$10,000,000 and the Maine sardine \$9,000,000. The value of canned shellfish was set at approximately \$38,500,000.



**smart
skippers
know
the ropes!**

And when it comes to getting the most out of Ship-to-Shore Telephone Service, here's how it's done:

1. Set up a listening schedule and tell callers ashore the best hours to reach you.
2. Tune in regularly to the Marine Operator's broadcasts—she may have an important call for you!
3. Keep your ship's registration up to date! When you buy or sell a ship equipped with radio-telephone, notify us so we can change the listing.



Pacific Telephone



**LASTING PROTECTION
for
WOOD and METAL
BOTTOMS**

INTER-TROP No. 50

... International Paint's Protection Against Fouling of All Kinds

Inter-Trop No. 50's toxic qualities have been tested in arctic and equatorial waters alike with this result: High resistance to every type of fouling growth and worms. Easy to apply because formulated with a full body; economical because it is laboratory-engineered for long life.

Interlux SILVER PRIMOCON

... International's Positive Primer

A specialized primer for metal bottoms! Practically impervious to salt-water. Primocon seals off plates, seams and rivets of dissimilar metals which tend to corrode by electrolysis. Use under Inter-Trop No. 50 for maximum protection against fouling.

At marine paint stores and depots throughout the world, or write for descriptive literature.



International Paint Co. (Cal.) Inc.
South Linden Ave., South San Francisco, Calif.
World's Largest Marine Paint Makers

Tuna and Tuna-Bait Resources

(Continued from page 11)

Since efficiency of fishing varies with vessel size, we compile basic data on catch-per-unit-of-fishing-effort by six vessel-size categories. By comparing records of vessels of different sizes during the same years, we have arrived at correction factors, so that the catch-per-day's-fishing may be corrected to a standard vessel size, to eliminate effects of changes in the average vessel size over the years.

From the catch-per-day's-fishing and the total catch may be computed the total fishing intensity, in standard units, for each year.

Consideration of these series of statistical data leads to valuable conclusions respecting the effect of fishing on the resources of the two tuna species, considering as a whole the populations of each species in the Eastern Pacific.

Figure 3 shows for yellowfin tuna for the years 1934 to date: (1) *total catch* by all vessels of all types, (2) *catch-per-day's-fishing* of a large sample of U.S. clippers standardized to a particular vessel size, measuring *abundance* as encountered, on the average, by the vessels, and (3) *calculated total effort* in terms of number of fishing days of a standard clipper.

It is quite obvious that as the amount of fishing increased from 1934 to the beginning of World War II, the catch grew quite steadily, but the abundance declined rather steadily also. With a partial respite from fishing during World War II, the catch dropped sharply and the abundance increased. With the rapid post-war increase of fishing effort, the yield increased again but the abundance fell.

From this graph it appears that the intensity of fishing has been sufficiently great to influence the abundance of the yellowfin tuna of the Eastern Pacific. This indicates, of course, only that the amount of fishing is large enough to affect the average size of the standing crop of this species, which is an inevitable consequence of a significantly large fishery, and in itself tells nothing about the relation of present level of exploitation to level of maximum sustained yield. Information respecting this last point required further consideration of the data in the light of some theory of populations dynamics.

The results of such examination of the data have led to the conclusion that the indensity of fishing reached by 1953 was near, or perhaps even slightly beyond, the value corresponding to maximum sustainable catch of yellowfin tuna. The intensity of fishing dropped sharply in 1954, and even more in 1955, due to economic factors, so that there does not appear at this moment to be imminent danger of overfishing. The Commission is, however, keeping careful records of current developments so that recommendations for preventive action can be made if the fishing intensity again climbs rapidly and seems to be going beyond the level of maximum sustainable catch.

The picture for skipjack is quite different. Similar series of measurements of catch, apparent abundance, and fishing effort for this species are presented in Figure 4. It may be seen that during the past 20 years the apparent abundance has shown very wide fluctuations not correlated with amount of fishing effort. Average level of catch-per-day's-fishing in recent years, with very much greater effort and catch than pre-war, is as high as formerly. Ancillary biological and oceanographic data are not yet adequate to determine the causes of the wide fluctuations in apparent abundance, but it seems clear that they are not related to amount of fishing.

It appears that, at present levels of fishing effort, the effect of fishing on this resource is so small that it

cannot be measured in the presence of large variations due to other factors. It may be concluded that the skipjack resource can support a much greater total catch than the present before reaching the maximum sustainable average yield.

Tuna life history, biology, and ecology

Although the collection, analysis and interpretation of statistical catch data are a fundamental element in the research program, they are not, in themselves, adequate as a basis of fisheries conservation management. The detailed interpretation of the catch statistics, in particular the variations *not* related to amount of fishing, as well as the devising of effective and efficient regulatory measures when required, demands an adequate knowledge of the life history of the tunas, of their behavior, and of their relationship to their environment.

These species are creatures of the high seas, leading a completely pelagic existence, usually far out from shore, during their entire lives. Study of them is, therefore, costly and difficult, as a result of which little scientific study of their ways of life has been accomplished until recent years. During the past decade some fisheries scientists of the United States, Japan and other countries have been able to devote considerable effort to this group of fishes, and our own staff has been conducting researches on them for four years, so that we are beginning to obtain some knowledge of the more important aspects of their biology.

The yellowfin and skipjack tunas during early years of life at least aggregate into schools near the surface.

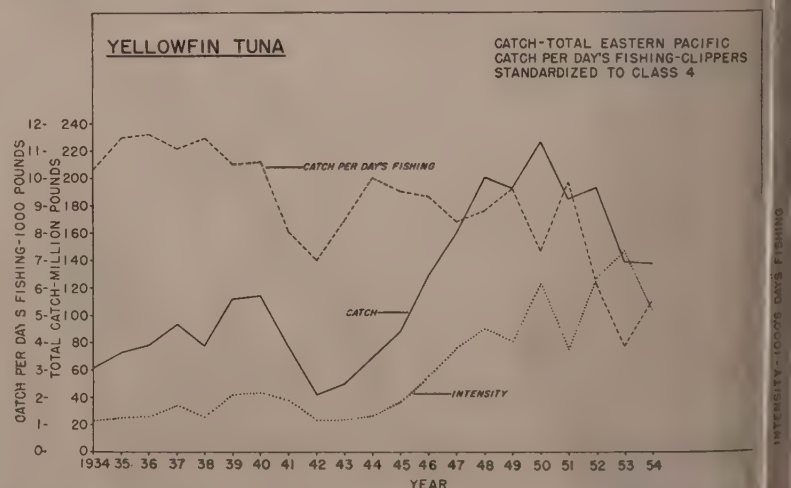


FIGURE 3.—Total catch, standardized catch-per-day's fishing, and calculated relative fishing intensity, for yellowfin tuna in the Eastern Pacific Ocean, 1934-1954.

surface. This habit is the basis of the American fishery, since both pole and line fishing and purse seining depend, for economical operation, on the occurrence of large, compact schools. Analysis of size frequencies of the commercial catch indicates that for both species the bulk of the catch consists of members of only two or three age classes, the youngest fish being probably in the first or second years of life.

In common with many other tropical fishes, the tunas appear to be very rapid-growing and subject to a high rate of natural mortality, so that the turnover of the standing crops of the resources is very rapid compared to that of many commercial fishes of high latitudes. The rapid growth of the tropical tunas, inferred from size frequency data, has been confirmed by direct measurement of the growth of tagged specimens, recovered after several months at liberty in the sea.

Spawning of the tropical tunas occurs over a wide geographical range and over a long season. Some of our recent studies, for example, indicate that yellowfin tuna spawn in waters off Baja California in the vicinity of the Revillo Gigedo Islands from at least May to September.

Off Central America, they spawn year-round throughout the whole year, with peak activity in the late winter and early spring. It is to be expected that, with a large spawning area and extended spawning season, large variations in year class strength will be less likely than for species having spawning more concentrated in place and time.

The extent, however, to which variations in year class strength may use fluctuations in abundance is being investigated by the continuing collection of extensive samples of the catch for measurement of size composition, from many different parts of the region of the American fishery.

This program of "market measurements" was commenced a little over a year ago and it will, of course, be several years before variations in year-class strength will be evident. The size frequency data thus collected are also valuable for inferring age and growth (as noted above), and as one approach to the problem of migrations and population structure, by comparison of the temporal sequence of modes in adjacent geographical areas.

A more direct approach to the problem of migrations and population structure is the employment of

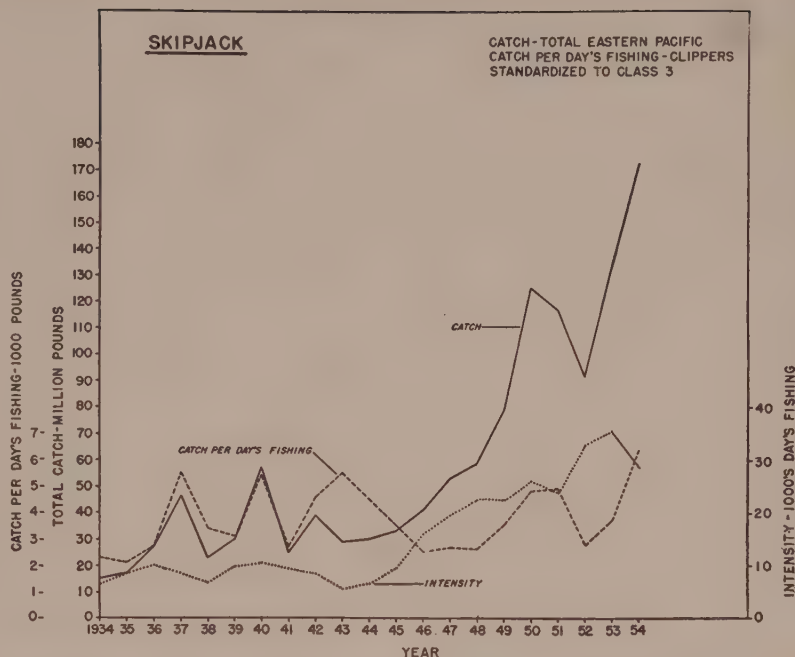


FIGURE 4.—Total catch, standardized catch-per-day's-fishing, and calculated relative fishing intensity, for skipjack tuna in the Eastern Pacific Ocean, 1934-1954.

tagged fish, the recovery of which gives a direct measure of net movement. Preliminary attempts by scientists of the California State Fisheries Laboratory have yielded some valuable information, indicating movement of several hundred miles in some instances. Rates of recovery of tagged specimens have been so very low, however, that the data are quite inadequate for any firm conclusions as to migration patterns. The staff of the Tuna Commission is now engaged in an intensive effort to develop improved methods of tagging tunas in the hope of achieving a "break through" in this important line of research.

Investigations of the feeding habits of the tunas by our staff and others in the Eastern Pacific, and by scientists of other agencies in other regions, indicate that the tunas feed quite omnivorously on all forms of pelagic animals encountered on the high seas which are of suitable size, ranging from Euphausiids and Squilla larvæ to moderately large Cephalopods and fishes.

The logbook records of the tuna vessels indicate, as has been mentioned previously, that concentrations of tunas tend to be found in certain areas, for example off Baja California, off the Gulf of Tehuantepec (in the early spring), off the Coast of Central America, and in the areas off the northern part of Peru and Ecua-

dor. These regions of concentration correspond, in general, with regions of high production of food organisms, which in turn depends on high production of the phytoplankton upon which all life in the sea depends. It further appears that these regions of high biological productivity are regions where the upper, sunlit layers of the sea are fertilized by the nutrients from the underlying deep waters, by upwelling, by mixing along current boundaries, and other physical processes. Since the circulation of the ocean which brings all this about is not constant, but is subject to variations between seasons and between years, it is probable that at least some of the fluctuations of the tuna fisheries may be cleared up by a better understanding of the oceanic circulation and the causes of its variations. This is a large problem upon which the Tuna Commission, in cooperation with the Scripps Institution of Oceanography and other agencies, has made only a small beginning, but which is being given high priority in our program.

Research on Bait Species

Important special and their distribution

The major share of the tuna catch is made with the use of live bait, taken mostly in inshore waters. Scientific information, to serve as a basis of conserving the bait resources, is therefore of great importance.

(Continued on page 20)

CRUISE REPORT

CRUISE of the *M/V N. B. Scofield*, January 10 to March 10, 1956, was planned (1) to explore the subsurface distribution and relative abundance of yellowfin and bigeye tuna in South and Central American waters; (2) to make observations and collections that may have bearing on tuna biology and the marine life encountered.

This vessel departed Los Angeles Harbor and visited Canal Zone and Santa Maria Island, Galapagos.

At each station along the route 40 baskets of sardine-baited longline gear were set commencing at 0600. Sets were usually completed by 0745. Two depths were fished by using five and 15 fathom float lines. Surface trolling was carried on along the longline set while the gear soaked and while underway for the next station. Retrieving the longline gear commenced at 1230 and was generally completed by 1445. The *Scofield* then proceeded to the next station 120 miles distant.

All tuna brought aboard were measured and their stomach contents examined. Gonad development was also noted.

From the 29 longline stations occupied, a total of 44 yellowfin and 43 bigeye tuna were caught. Four stations produced 77% of the total catch. The yellowfin catch was concentrated mainly in the waters encompassed by latitudes 8 to 12 degrees north and longitudes 87 to 91 degrees west. The heaviest yellowfin catch of 3.89 fish per 100 hooks occurred at Lat. 10°-04'N, Long. 90°-38' W.

The bigeye were caught at widely scattered locations in the area encompassed by latitudes 2 degrees north to 2 degrees south and longitudes 83 to 92 degrees west. One station at Lat. 1°-58' N, Long. 83°-09' W, produced the best catch of the cruise. This station yielded 29 bigeye and 1 yellowfin for a rate of 6.89 fish per 100 hooks. This was also the only station at which the two species were taken together.

Surface trolling on longline stations produced only one small yel-

lowfin. Surface indications of tuna-like fishes observed on two occasions at longline stations: A school of large yellowfin, observed near the longline set at Lat. 7°-58'N, Long. 90°-37'W, and was thought to have been responsible for the yellowfin catch on that station. Several small schools of frigate mackerel were observed near the longline set at the station of heaviest catch.

The catches on this cruise were, in general, consistent with those of a previous cruise in regard to occurrence of fish. In the numbers of fish caught, however, there were far fewer bigeye tuna caught on the latest cruise.

Bathythermograph casts off Central America indicated a shallow thermocline, the shallowest being 30 feet. Thermoclines off Ecuador and the Galapagos were generally deeper and were markedly different than those off Central America. A shoal area with a minimum depth of 405 fathoms was located in the vicinity of Lat. 5°-38'N, Long. 88°-26'W. The surrounding depths were in the range of 1500 to 1600 fathoms.

Surface water temperatures in areas fished ranged from 22.7 to 27.6 degrees centigrade.

Size composition showed a majority of the longline yellowfin catch was centered about a mode of 100 cm. fork length. Two minor size groups of small and very large fish were also caught.

There were two defined groups comprising the bigeye catch; averaging 98 cm, and 174 cm.

2. Sexual maturity: Many yellowfin in the 100 cm. group and larger were in a ripe or ripening state of maturity. All bigeye showed little or no development.

3. Stomach contents: Examination of stomach contents revealed that squid, octopi, and swimming crabs made up the bulk of the food of both yellowfin and bigeye. Snake mackerel (*Gempylus serpens*) were fairly numerous in bigeye stomachs at two stations.

Numerous schools of yellowfin tuna were sighted in the vicinity of

Cape Corrientes, Mexico. Small scattered schools of skipjack were quite numerous near Cape Mala, Panama. One night in the vicinity of Lat. 15°-35'N, Long. 94°-48'W, a large area of flipping lanternfish was passed through by the vessel for at least five miles and probably more. In general much more marine life was encountered near shore than in outlying waters.

Fish Week Plans

A Los Angeles man, Aldo Casaretto of Koulouris and Casaretto told the annual convention of National Fisheries Institute that producers, distributors and retailers of fisheries products can realize material increases in sales by tying their sales plans in with the annual Fish Week promotion of the industry.

"Fish Week, or Fish Parade as the promotion is called, offers one of the best opportunities we have for selling our products," said Mr. Casaretto. "Lent has always been considered our best sales period and the Fall one of the lowest. Inventories are high in the Fall; Fish Week was designed to overcome this situation."

Mr. Casaretto told how the Southern California Fisheries Association organized its promotion last year. Among other steps, members should ask their governors and mayors to proclaim as National Fish Week the period, October 29 through November 3, the dates agreed upon by the industry for the 1956 promotion. In-store displays, truck signs, car carter newspaper, radio and television publicity, were other methods used by the California association. The group also carried on its promotion through the school lunch plan in Los Angeles, the state board of fisheries at the United States Fish and Wildlife Service. The institutional trade was covered through the hotel and restaurant association.

"You will get out of Fish Week exactly what you put into it," concluded Casaretto. "Don't be worried that the big firms will get more of the promotion than the small ones. Each will gain sales according to effort he puts into the promotion. The Fish Parade, we have one of the best sales tools for increasing year-round consumption of fishery products."



REPORT FROM WASHINGTON

(Continued from page 3)

Another contract for \$20,000 provides for a year's study of the effect of Alaska sea lions and hair seals on the salmon and halibut fisheries.

Large-scale logging operations in the huge stands of virgin timber in Alaska are just beginning and the Fish and Wildlife Service is concerned about any possible damage to salmon streams. Of particular interest will be the extent of silting in the stream bed and any changes in salmon runs and the success of spawning.

The damaging effect which the big sea lions and the hair seal have on fishing gear in those northern waters is well known to the fishing industry; also, these animals have long been considered serious predators on salmon and halibut, but to what extent is not known. Now attention will be given to the locations of the rookeries of these animals, the total populations, the trend in populations and the food habits.

--0--

FIRST U.S. STANDARDS IN THIS INDUSTRY.--As the result of cooperative efforts by the fishing industry, the Department of the Interior, and the Department of Agriculture, quality standards similar to those that have proved so valuable as a marketing aid for agricultural products, will soon become available for fish and fishery products.

An official notice of proposed rule making for United States standards for frozen fried fish sticks was published in the Federal Register of April 26, 1956.

Frozen, fried fish sticks were selected as the product of highest priority by the fishing industry. A committee representative of fish stick producers and distributors actively cooperated with the FWS scientific staff in studies of the product and of the processing procedures required to insure the development of proper standards.

Also now in process of development are proposed standards for fish blocks (the raw material from which many fish sticks are prepared), and frozen raw breaded shrimp.

--0--

STANDARD FOR FISH STICKS.--The proposed standard for frozen fried fish sticks applies to whole rectangular-shaped portions of fish flesh, breaded, precooked, and frozen. It is recommended that the "largest dimension" (length) of the sticks be at least three times that of the "next largest dimension" (width), and the average weight of the individual sticks be not less than 3/4 ounce and not greater than 1 1/4 ounces. The grades proposed include "U.S. Grade A" and "U.S. Grade B." Quality below these grades would be classified as "Substandard."

Technical requirements for ascertaining quality include the factors of: flavor and odor; appearance as to size uniformity, color, and coating; defects; such character elements as ease of separation, wholeness, freedom from oiliness or crumbliness in the coating; tenderness and moistness of the flesh, and the consistency and adherence of the coating on the heated product.

The proposal does not define proper labeling nomenclature for this

product. Frozen fried fish sticks when sold in interstate commerce are required to conform to the labeling regulations of the Food and Drug Administration, Department of Health, Education, and Welfare.

Copies of the proposal are available upon request from the Fish and Wildlife Service, Washington 25, D. C.

--0--

PROFIT IN FISH SERVINGS.--Serving for serving, there is as much profit for the restaurateur in fish and shellfish as in steak, roast beef, roast pork or chicken, and in some instances there is more.

At least that is what two-thirds of the operators of public eating places reported in a recent study of 4,500 establishments. These operators are representative of the 208,000 public eating places in the United States which serve fish and shellfish.

According to John L. Farley, Director of the Fish and Wildlife Service, 40% of the managers contacted in the survey reported that there is more profit in a serving of fish than in a serving of steak and another 29% say there is just as much.

--0--

HEAVY TROUT PLANTINGS.--The Fish and Wildlife Service hopes to plant 6,000,000 catchable-size trout in waters on Federal lands and in waters near Federal installations during the 1956 fishing season, reports Secretary of the Interior Douglas McKay. This is 60% above the plant of 1954 and considerably higher than the 1955 distribution although these latter figures are not yet available.

The Service also is carrying out a \$665,000 construction program during the year, the Secretary said. One big trout hatchery is being built at Norfork, Arkansas. Other construction jobs include \$40,000 for the replacement of wornout facilities at Springville, Utah; and a thousand dollars at Quilcene, Washington, for administrative reasons.

At present FWS is operating 91 hatcheries, and more than half are used for the production of trout.

--0--

JAPANESE AND RUSSIAN CLAIMS.--Japanese fishing companies are reported ready to fish for salmon as originally scheduled in the general area affected by the Soviet Union's recent announcement that only Russians should fish in that part of the Northern Pacific.

The Japanese are planning to dispatch 19 fleets, five more than last year, operating some 500 catcher boats. Normally these salmon fleet leave Japan for northern Pacific waters early in May.

The Dai Nippon Fishery Association presented the Japanese government with a petition strongly protesting the action of the Soviet Union. Also, because of the vagueness of the Soviet pronouncement with respect to the area affected and specific measures to be taken, the Japanese are willing to risk fishing there and contend that any such action by Russia is in violation of international law. While the Association is letting the Japanese companies take the risk on their own, and not "trouling" the Japanese government, hope is expressed for an early settlement of this and other unsettled issues pending between the two countries.

Airplane Spotting Flight

April flight of the California Department of Fish and Game "Cessna" surveyed the inshore area from San Francisco to San Diego. This is the third of a series of periodic flights designed to study pelagic fish distribution, abundance and behavior in 1956.

No schools of fish were sighted in the Central California area (San Francisco to Pt. Conception) during the flight. It is known, however, that schools of anchovies were present in Monterey Bay and it is believed that heavy seas stirred up by strong northwesterly winds drove the fish to depths below the limit of visibility from the air.

Another factor contributing to poor visibility into the water was the presence of very rich "brown" water along the Central California coast.

Species identification of fish schools was possible through a combination of observation from the air and interviews of commercial fishermen working in areas where fish are spotted. Night fishermen could find no anchovies in the Huntington Beach area but in the daytime commercial airplane spotters found large schools. Conversely, night fishermen found jack mackerel schools in this same area at night but fishermen and

planes working at daytime found but a few small schools of jack mackerel. All schools seen on this flight were tentatively identified as anchovies.

Help People to Eat More Fish

Plans for increasing fish product consumption by one pound per person—165,000,000 pounds a year—were presented to the 11th annual convention of the National Fisheries Institute, by Harry A. Trimm, Jr., Birds Eye Division of General Foods and chairman of a special committee of the industry to increase fish product consumption.

"Other trade groups have capitalized on their opportunities by cooperative action to increase product consumption," said Mr. Trimm, "by simply applying promotional and marketing techniques to what individual producers and processors do on behalf of their trade-named products. They have made their products glamorous and appealing by such joint efforts. We of the fisheries industry need to apply a few adjectives to our products such as delicious, delectable and nutritious. This could add as much as \$25 million to our industry's annual volume."

Bludworth Marine Now a Division of Kearfott

Announcement has been made that as of April 1, 1956, Bludworth Marine, for 30 years actively engaged in the manufacture, sales and service of electronic instruments, became a division of Kearfott Company, Inc., a subsidiary of General Precision Equipment Corporation.

Kearfott Company, Inc., is well known in the aviation and marine industries, manufacturing gyros, control components, navigation systems, radar components and test equipment. Willard C. Blaisdell, long associated with Bludworth Marine, will serve as General Manager of the new Division.

Expanded activity in the marine field has created a need for new designs, components and instruments. It is expected that this new relationship combining the Bludworth Marine service organization and knowledge of its specialized field with Kearfott's large engineering and production facilities will better serve the need for new marine instruments while maintaining the same high quality and service standards to which both companies have always adhered.

SEACORD'S

Pump & Injector

SERVICE

"All Makes"

SALES

AMERICAN BOSCH

BENDIX SCINTILLA

ADECO FUEL PRODUCTS

TROJAN BATTERIES

Belmont 4-1454

1337 India Street

San Diego 1

California

Reprints

DID YOU LIKE
YOUR AD THIS MONTH?

Why not have a reprint
made for your own use!

1000 Copies, one color.....\$12.00

Additional 1000.....\$ 7.50

PRINTED ON 60 LB. ENAMEL PAPER

Multiple Color Ad Rates on Request

(These prices if order received by 15th of month)

McINNIS PRINTING & PUBLISHING
127 South Olive Street
ORANGE, CALIFORNIA
Phone 783

Tuna Resources

(Continued from page 15)

Figure 5 indicates the principal baiting areas for the important tuna-bait species, and Figure 6 shows the estimated catch, by species for the years 1947-1954, based on logbooks records of U.S. vessels.

As may be seen from Figure 6, only five species are taken in sufficient quantity to indicate even a remote possibility that the amount of fishing might adversely affect the continuing harvest. These are: The California sardine and northern anchovy taken off California and Baja California; the tropical anchoveta, *Cetengraulis*, taken in various bays from Almejas Bay in Baja California to the Gulf of Guayaquil; the Galapagos sardine; and the southern anchovy (called anchoveta in Peru) taken off the Peruvian Coast.

Of these five species, three are subject to other fisheries much greater in magnitude than the fishing for tuna bait (California sardine, northern anchovy, southern anchovy) and these species are also being studied by other agencies. In view of this, our staff has limited itself to gathering data on the amounts taken by the tuna boats, collecting samples, and otherwise cooperating with the other agencies studying them.

For the Galapagos sardine our studies have been confined to collecting catch data and limited biological examination of samples from tuna vessels. Detailed study of this species is not possible without work by scientists at Galapagos, which we cannot now undertake.

The remaining species, the anchoveta, *Cetengraulis mysticetus*, is the mainstay of the tuna fishery. Because of the importance of this deep-bodied, tropical anchovy to the fishery, and because of lack of knowledge concerning it prior to our research, we have concentrated our bait-fish investigations on this species.

Investigation of the anchoveta and other bait species are conducted not only at our headquarters laboratory, but also at regional laboratories in Costa Rica and Panama, which have been established for the purpose of studying the biology and ecology of the bait fishes of the Gulf of Nicoya and the Gulf of Panama, respectively.

Biology, ecology, and life history of anchovetas

Studies of meristic characters of anchoveta specimens from the several important baiting areas has indicated

BAITING AREAS & PRINCIPAL BAIT FISHES



CALIF. SARDINE & N. ANCHOVY
CALIF SARDINE
ANCHOVETA
GALAPAGOS SARDINE & SALIMA
PERU SARDINE & ANCHOVY

FIGURE 5.—Principal baiting areas in the Eastern Pacific.

that there is little or no interchange of anchovetas among these areas. The lack of extensive migrations is probably related to restriction of suitable feeding areas for adult stages, which primarily feed by grazing on mud-flats, eating the microscopic plants, and perhaps the organic detritus, which are abundant there. In any event, it appears that the population of each major baiting area should be treated as a separate biological unit.

In order to obtain some idea of the effect of fishing on the anchoveta populations we have gathered from tuna-vessel logbooks estimates of the amount of fishing in each baiting area for each year from 1947 to date, and the resulting catch, as well as the apparent abundance, measured by the catch-per-day-of-baiting. From these data it appears that the abundance of anchovetas in each of the major baiting areas is subject to wide variations from year to year, but that these are uncorrelated with amount of fishing, and so are probably due to natural factors. We are, of course, continuing to collect similar data currently. Such data are valuable not only for measuring fluctuations in abundance for correlation with possible natural causes, but also to enable us to detect any adverse changes in the anchoveta stocks due to fishing, so that corrective measures can be recommended when and if required.

Analysis of size-frequency data from several baiting areas has made

it possible to follow model size-classes over long time periods and thus learn about the age and growth. It appears that this species is very rapid-growing in all areas, reaching 130 to 135 mm. at one year of age, at which time the fish are sexually mature and spawn.

The natural mortality rate is evidently very high, because no fish live very long, although in this respect there appears to be some difference between areas. In Panama most individuals live less than one year. Specimens are seldom taken in their second year of life, and those in the third year almost never. At Guaymas and Ahome Point in the Gulf of California, on the contrary, in some years a considerable share of the catch is composed of fish in their second year of life, and a significant number in their third year.

Since, even with these differences the anchoveta is everywhere short-lived, and in some places is essentially an annual crop, the observed fluctuations in abundance are not too surprising, when we consider that these are inshore fishes of restricted habitat, the success of reproduction of which is likely to be heavily influenced by variable environmental conditions.

In order to rate the effects of environment on the anchovetas, and in order to work out the details of the life history and biology, continuous investigations of these matters are being conducted in the Gulf of Panama as well as on the hydrography and the basic biological productivity of the Gulf. At the present time, a concentrated effort is being made to work out the details of the spawning and early larval development of the anchoveta there, as a basis for further

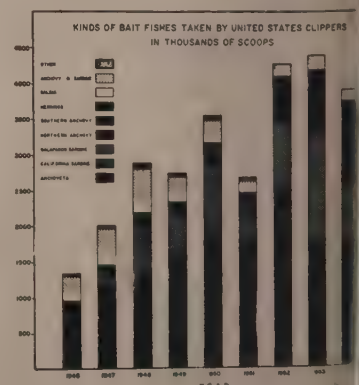


FIGURE 6.—Estimated total catch, by species, of bait-fishes by tuna fishing vessels based in the United States, 1947-1954.

estigations of the distribution and
cess of spawning in relation to
rographic factors.

Investigations in the Gulf of Nicoya

The Gulf of Nicoya in Costa Rica
at one time an important bating
und for anchovetas, but the fish-
failed after 1947—due, it is be-
ed, to extensive occurrence of “red
s” which wiped out the popula-
i. During 1952 and 1953 extensive
ecting and observing in all parts
the Gulf failed to produce a sin-
specimen.

n an attempt to rehabilitate this
ulation, the Commission in the
of 1953 conducted an experimen-
transplantation of approximately
f a million adult anchovetas from
Gulf of Panama. These fish
arently spawned successfully, be-
se in the spring of 1954 we began
atch young, zero-year-class speci-
is in small numbers. The staff of
laboratory at Puntarenas is con-
ting to observe this re-established
ulation and to collect hydro-
phic and other related data in the
f of Nicoya.

During 1954 the progeny of the
isplanted fish reached maturity
l commenced spawning. During

1955 increasing numbers of speci-
mens have been taken in our collec-
tions. It appears that the anchovetas
are living and reproducing in the
Gulf of Nicoya, and that the popula-
tion is increasing, but still far from
sufficient to support any fishery. We
shall continue to observe the increase
of this population, and to study its
ecology and biology.

It is hoped that in a few years the
Gulf of Nicoya will again be able
to support a fishery for this species.
It is, of course, impossible to fore-
cast the rate of increase of the popu-
lation, but the initial results are most
encouraging. It is not to be expected
that the Gulf of Nicoya can ever sup-
port a bait fishery of the magnitude
of the Gulf of Panama, because it
lacks the physical conditions for the
extremely rich biological productivity
of the latter area, and is of smaller
extent also.

Summary and Conclusion

It may be seen from the foregoing
that the Inter-American Tropical
Tuna Commission's research task is
not, except in the case of the Gulf
of Nicoya, in the nature of an emer-
gency program to rebuild the fish
stocks. Both for the tunas and for
the bait species our mission is the

continuing assessment of the condi-
tion of the fish stocks, and the gath-
ering of extensive and adequate scien-
tific information, to make possible
the wise and effective regulation of
the fishery at such times and places
as regulations are shown to be re-
quired.

The Commission, in being able to
conduct its scientific studies on an
international basis, and in a careful,
comprehensive, and orderly fashion,
will be able to provide the necessary
scientific information for effective
management when it is required. This
is, I believe, an almost unique exam-
ple in fisheries conservation, and may
well serve as an example for other
similar problems in this hemisphere
and throughout the world. *

Crowther Returns to FWS

Harold E. (Skip) Crowther re-
joined the Fish and Wildlife Service
on April 4, after an absence of
nearly three years. In 1953, he
resigned as Chief of the Service's
Technological Section to conduct re-
search work for a company in Bos-
ton, Mass. Now he will act as coordi-
nator of the Saltonstall-Kennedy
projects for the Branch of Commer-
cial Fisheries.

Know Your Industry . . .

Keep abreast of the latest developments in your industry

Read Pan American Fisherman . . . *REGULARLY!*

SUBSCRIBE HERE!

Please enter my subscription for

1 year for \$3

2 years for \$5

In the United States and possessions.

Canada \$4 per year; all other countries \$5 per year.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

☐ Bill Me

☐ Check Enclosed

Mail to PAN AMERICAN FISHERMAN, Orange Savings Bldg., Orange, Calif.

MAIL
THIS
TODAY



DIRECTORY

Marine Sales and Services

These Firms Specialize in Serving the Fishing and Waterfront Industries.
They Understand Your Problems — Save Time and Money by Calling Them

CANVAS

"Canvas Sea Anchors"



"Everything in Canvas"

J. E. MEYER

BEImont 9-0550

LICENSES

SAVE 25%

On Mexican Bait Licenses

Write or Phone to . . .

NAVIERA y COMERCIAL

SHIP BROKER

P.O. Box 119 Phone 126
ENSENADA, BAJA CALIF., MEXICO

SUPPLIES

Headquarters for . . .

MARINE and INDUSTRIAL
SUPPLIES

OIL BURNING RANGES

The Carlson Co.

Phone BEImont 3-5444

1760 Kettner • San Diego 1

BROKERS

SERVICE FOR TUNA CLIPPERS
COMPLETE CUSTOMS CLEARANCE

Shreve & Hays

CUSTOM HOUSE BROKERS

Room 1 — B St. Pier

SAN DIEGO CALIFORNIA

Phone BE 9-8019

FUEL INJECTOR SERVICE

Sales & Service

AMERICAN BOSCH
BENDIX SCINTILLA
ADECO FUEL PRODUCTS
TROJAN BATTERIES

SEACORD'S

1337 India St. San Diego 1
BEImont 4-1454

ELECTRICAL

**CALIFORNIA
ELECTRIC WORKS**

Complete Electric Service

24 hours a day for 37 years

BEImont 2-2145

424 8th Ave. San Diego, Calif.

SALT

That Salty Salt

**WESTERN SALT
CO.**

Plant Office
South End of 1245 National Ave.
San Diego Bay
SAN DIEGO
CALIFORNIA

PAINTS

W. P. FULLER & CO.

MARINE PAINTS and
GLASS

512 Front — BEImont 2-2033
803 7th — BEImont 9-4373
San Diego, California

INSURANCE

- LIFE
- ANNUITIES
- RETIREMENT
- MARINE
INSURANCE

"Low Guaranteed
Cost"



M. E. SIMAS CO.

622 Rosecrans St.
San Diego 6, California
AC 2-3188

PHOTOGRAPHY

Largest and Best Equipped
Studio in San Diego

BUSCO-NESTOR

PHOTOGRAPHY

COMMERCIAL • INDUSTRIAL
MARINE

SALVAGE OPERATIONS

BEImont 9-4743

2670 5th Ave. • San Diego, Calif



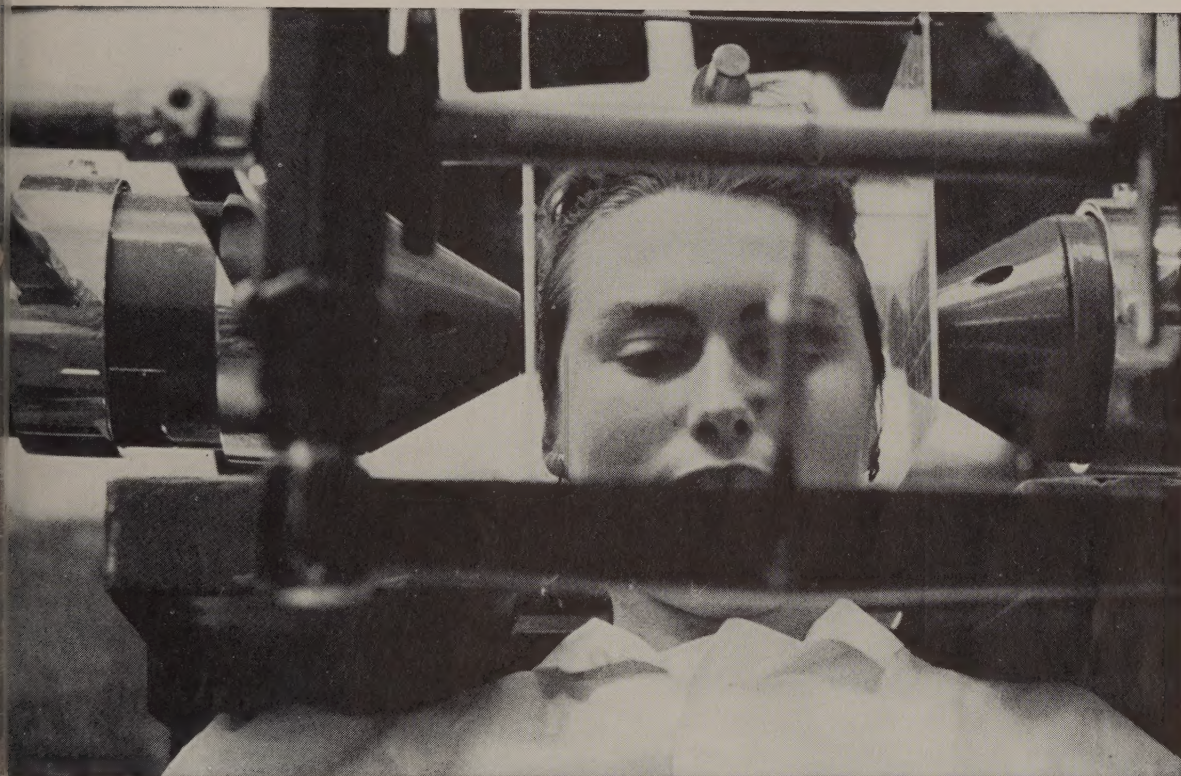
Easy Way to Subscribe

On page 21 is a handy sub-
scription blank; use it to make
sure you don't miss an issue.

USE THE SUBSCRIPTION BLANK ON PAGE 21



THE NEXT MEDICAL MILESTONE . . . CONQUEST OF CANCER?



In a few short years we've seen the discovery of antibiotics, new wonder drugs for tuberculosis, a vaccine for polio. We will see the conquest of cancer, too, if people want it badly enough. Last year the American Cancer Society was unable to fill requests for research funds totalling almost \$3,000,000. The reason—not enough money. Did you give all you could? Will you give all you can?

GENTLEMEN: I want to help conquer Cancer.

- ☐ Please send me free information about Cancer.
- ☐ Enclosed is my contribution of \$_____ to the Cancer Crusade.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

MAIL TO: Cancer, c/o your town's Postmaster

AMERICAN CANCER SOCIETY



Working Toward a . . .

BIGGER AND BETTER FISHERY MARKET

MOST fishery interests agree that things are looking up for the future. Some of our most troublesome problems are being recognized and helpful solutions searched out—by both business and government authorities. You can read about them on other pages in this magazine.

With the American economy in general on a high level, and most lines of business apparently destined to remain that way, we believe that the fisheries situation also will shape up quite satisfactorily.

Our efforts now and always are dedicated to the creation of bigger and better markets for canned tuna, and to advance the best interests of the entire tuna industry.

CALIFORNIA FISH CANNERS ASSOCIATION INC.

**Breast-O'-Chicken, Inc. • California Marine Curing & Packing Company
Coast Fisheries (Division of the Quaker Oats Company)
Franco-Italian Packing Company, Inc.
High Seas Tuna Packing Company, Inc. • Pan-Pacific Fisheries, Inc.
South Coast Fisheries, Inc. • South Pacific Canning Company
Star-Kist Foods, Inc. • Sun Harbor Packing Company
Van Camp Sea Food Company, Inc.
West Coast Packing Corporation • Western Cannery Company**